Periscope.

PHYSIOLOGY OF THE NERVOUS SYSTEM.

Division of the Posterior Commissure of the Brain. *Pflüger's Archiv*, Band 38, Heft 3 and 4.

Dr. Darkschewitsch has made a series of experiments upon this subject.

The changes of the iris by the light reflex, which ensues after a lesion of the posterior commissure, permit the following conclusion to be drawn : a lesion of the posterior commissure causes a depression of the irritability of the oculomotor nerves. The degree of the diminished irritability is dependent on the extent of the injury to the fibres of the posterior commissure. A complete destruction of the posterior commissure causes a complete loss of irritability of the oculomotor nerves, as regards the light reflex.

The Nerves of the Pupil. *Pflüger's Archiv*, Band 38, Heft 5 and 6.

Miss Schipiloff and Prof. Schiff have made a series of experiments upon frogs in regard to this subject. She holds that nerves dilate and contract the pupil, but protests against the way they do this as stated in the text-books. The nerves of the sympathetic going to the eye contain dilator nerves, in the sense that their irritation dilates, and their paralysis lessens the dilatation. The normal physiological dilatation is not called out through the sympathetic but through the letting up of the activity of the oculomotor.

In regard to the activity of the oculomotor and its relation to the sympathetic, she has made a few experiments upon frogs. She tried to find out how the activity of the sympathetic is caused, or when the oculomotor is paralyzed. In frogs the nerve was cut within the skull, and a considerable dilatation ensued. If now the frog was frightened or irritated in the sensory sphere, the pupil became larger, and soon after the cessation of the irritation it returned to the size it was before. After a longer or shorter time the sympathetic, at the level of the uppermost vertebra, was divided. This caused a slight narrowing of the pupil, notwithstand-

ing the paralysis of the oculomotor. The pupil dilates upon irritations of the skin, of whatever nature, and this dilatation is due to the sympathetic, and disappears by complete section of the roots of the nerves going through the sympathetic to the iris.

The influence of ocular movement upon the size of the pupil in frogs is small. She does not believe in the tonic influence of the ganglia along the sympathetic upon the pupil, but that all tonic influences are in the central nervous system, and that they are not spontaneous, but called out by sensory peripheral irritation.

Effect of the Long Ciliary Nerves Upon the Pupil. *Du Bois' Archiv*, 1886, 1 and 2 Heft.

Dr. J. Jegeron has studied the influence of these nerves upon the pupil in the cat and dog. The animals were curarized, and the nerves were irritated by mechanical or electrical means. His experiments led him to draw the following conclusions :

1. All dilator nerves of the pupil pass to the ocular bulb without the mediation of the ciliary ganglion. 2. After section of all the long ciliary nerves the pupil is contracted, but preserves its regular form. Section afterwards of the sympathetic causes no increased contraction of the pupil, and irritation of the peripheral and of the sympathetic or the central end of a sensory nerve causes no dilatation of the pupil. 3. The irritation of the peripheral end of a long ciliary nerve causes a partial contraction of the iris—that is to say, a one-sided dilatation of the pupil.

If all the long ciliary nerves are not cut, the pupil is narrowed, but has an irregular form. If now the cervical sympathetic is cut, then the pupil is narrower, whilst the form of it is regular. If the peripheral end of the sympathetic is irritated, or the central end of a sensory nerve, then a dilation of the pupil ensues, although irregular in form.

Hence it is demonstrated that the dilator fibres of the Gasserian ganglion leave it through the first branch of the trigeminus and reach the iris through the long ciliary nerves.

Periodical Respiration and Superfluous Respiration. *Archives Italiennes de Biologie*, tome vii., fasc. i.

Prof. Mosso, of Turin, has made a series of experiments upon this subject. He finds that the movements of respiration are not always uniform and regular. In profound repose, and specially in sleep, there are in man, as in animals, groups of inspirations, whose amplitude successively increases and diminishes. The old view, that there is only one respiratory centre, should be abandoned, as the muscles of the face, the diaphragm, the thorax, and abdomen have special centres which act in an automatic manner. The number and amplitude of the respiratory movements are not always in direct relation with the respiration of the tissues and blood, and proportional to the need of oxygen introduced or of carbonic acid exhaled. Inhalations of oxygen and artificial respiration are not

able to modify the periods and intermittency of the respiratory acts. It is not possible to admit an absolute, continuous relation between the mechanical and chemical part of the respiration. The study of the circulation of the blood in the forearm shows that the blood-vessels do not take part in the phenomena of remittent, periodical respiratory movement. Periodical respiratory movement is not in direct relation with the vascular phenomena. The changes of the circulation in the nerve-centres are not able to produce the phenomena of periodical respiration.

The long pause and the intermittence in periodical respiration are not due to apnœ, as Lilehne believes. He explains the periods in respiratory acts as follows: That when the nerve-centres incline to rest, they forget to set up respiratory acts, and the organism does not perceive this short pause in the respiration.

ISAAC OTT.

Structure and Function of Vascular and Visceral Nerves. W. H. GASKELL. *Journal of Physiology*, vii., No. 1.

The spinal cord of the dog has connections at every level with the sympathetic system by certain visceral branches of the spinal nerves, which pass to the ganglion lying on the vertebral column (lateral ganglia). From these ganglia nerves pass to a second set of ganglia (collateral ganglia), and from these, in turn, nerves pass to the third set of ganglia (terminal ganglia) in the organ or vessel walls. The first set is the proximal set; the second and third sets are distal sets. Each spinal nerve has a visceral branch. Each thoracic visceral nerve has apparently a white and a gray portion. The white portion issues in both anterior and posterior nerve-roots from the cord, but is only found in the nerves from the second thoracic to the second lumbar segment of the cord. Above and below these levels the entire visceral part of the spinal nerve consists of the gray portion only. The white rami communicantes pass not only to the lateral ganglia opposite their exit, but also turn up and down, and thus reach both the cervical ganglia above and the lumbar and sacral ganglia below. They alone make the connection between the spinal cord and the sympathetic system; for the gray portions really spring from the lateral ganglia and pass to the spinal cord, supplying the spinal nerves, the vertebræ, and the membranes of the spinal cord, and having no function in transmitting impulses from the spinal cord outward. All impulses from the spinal cord to the sympathetic system make their exit in the nerve between the second thoracic and second lumbar nerves, inclusive. These nerves are the only ones (with two exceptions soon to be mentioned) which contain very small nerve fibres—5.4 μ to 3.6 μ in diameter. Hence the conclusion is reached that the calibre of the visceral nerve fibres is small. Such small fibres are also found in the second and third sacral nerve-roots which constitute the nervi erigentes. Gaskell proposes to call the rami communicantes from the spinal cord to the cervical

ganglia the cervical splanchnics; those to the abdominal ganglia the abdominal splanchnics; those to the nervi erigentes the pelvic splanchnics. In the spinal accessory nerve small fibres are found which collect together and pass to the ganglion trunci vagi. These are the only visceral fibres from the cervical cord. The vagus and glosso-pharyngeal contain a few such fibres in the medulla.

The distribution of the visceral nerves is summed up as follows:

They come from the central nervous system in definite sacral, thoracic, and cervico-cranial regions, whence they pass into the ganglia of the visceral system.

From the sacral region they pass out in a single stream to the ganglia of the collateral chain.

From the thoracic region they pass out in a double stream, one to the ganglia of the lateral chain, the other to the ganglia of the collateral clain.

From the upper cervical region they pass out in a single stream to the ganglia on the main stems of the vagus and glossopharyngeal nerves.

Vaso-motor (constrictor) nerves for all parts of the body can be traced as bundles of the finest medullated fibres (varying in size from 1.8 μ to 3.6 μ in the anterior roots of all the spinal nerves between the second thoracic and second lumbar inclusive, along the corresponding ramus visceralis, to the ganglia of the lateral chain (main sympathetic chain), where they become non-medullated, and are thence distributed to their destination, either directly or after communication with other ganglia. There is no satisfactory evidence for the presence of vaso-motor (constrictor) nerves in the roots of the cranial nerves. All the vaso-constrictors originate in the thoracic portion of the spinal cord.

The visceral motor nerves, upon which the peristaltic contraction of the thoracic portion of the œsophagus, stomach, and intestines depends, leave the central nervous system in the outflow of fine medullated visceral nerves which occurs in the upper part of the cervical region, and pass by way of the rami viscerales of the spinal accessory and vagus nerves to the ganglion trunci vagi, where they become non-medullated. They therefore resemble in structure and distribution the vaso-motor nerves.

The vaso-inhibitory or vaso-motor nerves are medullated all the way to their termination, which is in the distal ganglia of the sympathetic system; whether they there become non-medullated and pass on to the terminal ganglia, is undecided. The inhibitory nerves of the lumbar muscles of the alimentary canal in its appendages leave the central nervous system in the anterior roots and pass out among the fine medullated fibres of the rami viscerales into the distal ganglia, without communication with the proximal ganglia.

Fibres which are medullated from the cord to the ganglia, lose their medullary sheath at the ganglia. Each fibre passes out of the ganglion not as a single non-medullated fibre, but as a group of

non-medullated fibres. The ganglion cells not only assist in the conversion of a single nerve fibre into a group of fibres, but at the same time are centres for the members of the group, in so far as they possess a nutritive power over them ; they are not, however, centres in the sense of being capable of reflexly setting these fibres into activity. M. A. STARR.

PATHOLOGY OF NERVOUS SYSTEM.

Le Rhumatisme Cérébral, la Folie Rhumatismale, et la Goutte Cérébrale. LEGRAND DU SAULLE, *Gazette des hôpitaux*, pp. 57, 58, 59, etc.

In a series of lectures Legrand du Saulle calls attention to the various disorders of the intellect found in rheumatic and gouty patients. After first speaking against the prevailing tendency of considering insanity as a morbid entity, he says that more attention should be paid to the connection between mental affections and the various diatheses and dyscrasias. So he now wishes to call attention to the influence of rheumatism and gout in the production of these disorders. The attacks of cerebral rheumatism (rheumatic insanity) may be either overacute, acute, subacute, or chronic. The meninges in this affection comport themselves in the same manner as serous membranes in other parts of the body, those of the joints, for instance, and may be attacked in the same manner. The lesion and process are the same in both. The same as that joint which is the weakest is the one generally attacked in rheumatic patients, so the meninges are generally affected in those whose nervous system is weakened through whatever cause. Therefore heredity is an important etiological factor. Hysterical and epileptic patients seem to form an exception. Those addicted to alcohol, on the contrary, are frequently affected. The better class of patients are the ones most frequently affected for the reason that their brain is more used and that they suffer more from cerebral fatigue. Therefore intellectual pursuits and severe mental efforts act as exciting causes. The overacute and acute forms are preceded by certain prodromal symptoms. They rarely occur before the fifth day of a rheumatic attack ; generally between the fifth and twentieth. Exceptionally high temperature and intensity of cardiac manifestations are significant, but restlessness of the patient, moral anxiety, preoccupation for the future, transitory delirium, and persistent insomnia, are to be looked upon with the greatest apprehension. The overacute form is sometimes preceded by one or another of these symptoms, but generally it attacks the patient with intense suddenness. This is the rarest of all the forms, having occurred only five times in sixty-nine cases of cerebral rheumatism. The acute form occurred fifty-two times in the sixty-nine. It is preceded by the various symptoms : the temperature rises, the pulse increases, muscular twitchings occur, and the delirium appears. The delirium is generally of a low-